PARTS SPECIFICATION

CODE IDENT NO. 23835
SPEC NO. CS510818 REV B
ISSUE DATE.
SUPERSEDING. CS510818 A
DATED. 6 December 1974

CHIP RESISTOR
FIXED FILM,
GENERAL SPECIFICATION FOR

ENGINEER: R.L. Herin DATE
Section 514 Discrete Parts and
Integrated Circuits

RELEASED BY: J.W. ANDERSON DATE
Section 648 Technical Editor
Documentation Section

APPROVED BY: S. SOLLOCK DATE
Section 514 Supervisor,
Discrete Parts and Integrated
Circuits

JET PROPULSION LABORATORY
CALIFORNIA INSTITUTE OF TECHNOLOGY
PASADENA CALIFORNIA

CHANGE INCORPORATION LOG

CHG.LTR.	RELEASE		AUTHORITY	PAGES AFFECTED	DATE	ENGINEERING APPROVAL	
	INIT.	SEC.				INIT.	SEC.
A	HGH	655			12/6/74	RJW	365
B				REWRITE	10/1/92	RLH	514

CONTENTS

Paragraph **Page**

LIST

1. SCOPE

1.1 Scope. Delete and substitute the following: This document establishes the general manufacturing and testing requirements for a fixed, film, chip, established reliability, resistor. MIL-R-55342 is used as the baseline. This document lists exceptions to MIL-R-55342 and adds requirements to make it suitable for the acquisition of resistors to meet the quality and reliability requirements of JPL mission class A and B procurement. Detail requirements, specific characteristics of resistors and other provisions which are sensitive to the particular use intended shall be specified in the applicable detail specification. This document is not intended for qualification of parts (inclusion in the qualified products list, QPL) as defined by MIL-R-55342.

1.1.1 Format. The format of this specification is called the exceptions style. It is based on the MIL-R-55342 drawing with the only listings on the CS510818 drawing being exceptions or additions to the MIL-R-55342 military specification.

1.2.1 Military Part Number. Delete and substitute as follows:

1.2.1 Part number. The part number shall be in accordance with the JPL detail specification (See 3.20 herein).

2. APPLICABLE DOCUMENTS

2.1.1 Specifications and standards. Delete and substitute the following: The requirements of the following documents form a part of this specification unless exceptions are noted herein, in the detail specification, or in the procurement document. The revision level shall be the latest of that document at the time of the request for quotation. The contractor may contact the JPL negotiator to obtain copies of these documents.

SPECIFICATIONS

Military

MIL-R-55342 Resistors, Fixed, Film, Chip, Established Reliability, General Specification for

Add the following paragraph:

2.1.3 Exceptions. References to the U.S. Government and its agencies shall be taken to refer to JPL. The detail specification shall be the JPL detail specification. Requirements for qualification apply only to QPL listed resistors.

2.2 Order of precedence. Delete and substitute as follows: In the event of conflict between the requirements of this document and other requirements, the precedence in which requirements shall govern, in descending order, is as follows:

a. Procurement document (contract or purchase order).

b. Applicable device specification (associated detail specification).

c. This specification.

d. Specification and standard referenced in 2.1.

Add the following:

2.3 Terms and definitions.

2.3.1 Contract technical manager. The contract technical manager shall be the principal technical interface between the manufacturer and JPL.

2.3.3 Trace number. The trace number is the number assigned by the procurement document to link a part number to a specific purchase order or order release.

2.3.4 Screening. Screening consists of the tests performed on 100% of the resistors to the requirements of table XII herein (See 3.23 herein).

2.3.5 Technical direction. Technical direction shall mean written direction, usually on a JPL technical direction memorandum (TDM) form.

3. REQUIREMENTS

3.2 Qualification. Delete and substitute as follows: If the resistor styles are QPL listed, the manufacturer shall provide a copy of the data required in MIL-R-55342 paragraph 4.4 for qualification or retention of qualification. The data shall be for the most recent qualification test preceding delivery of the JPL resistors.

Add the following:

3.2.1 Combining screening lots. Purchase Order line items for screening may be combined to form a single lot if the following requirements are met:

a. All of the combined line items shall be of the same chip style (Power rating).

b. All of the combined line items shall have the same resistance temperature characteristic.

c. All of the combined line items shall have resistance values within one of the following categories; The highest one-third, middle one-third or lowest one-third of the resistance range for that style.

3.2.2 Product For Shipment. Resistors shall not be shipped to JPL until the inspection lot has passed screening inspection per table XII herein unless the JPL contract technical manager has given technical direction to ship ahead of QCI completion or unless prior shipment is required herein (i.e., catastrophic failures for analysis).

3.5 Design and construction. Add the following: The manufacturer shall advise the JPL contract technical manager of any changes in design and construction.

Add the following:

3.16.3 Screening inspection. When resistors are tested as specified in 4.7.10, there shall be no evidence of mechanical damage. The change in resistance between the initial measurement any succeeding measurements up to and including 168 hours, shall not exceed ±(0.5 percent +0.01 ohm) for characteristics H and K, ±(2.0 percent +0.01 ohm) for characteristic M, ±(0.2 percent +0.01 ohm) for characteristic Y, and ±(0.5 percent +0.01 ohm) for characteristic E.

3.20 Marking. Delete and substitute as follows: Each resistor shall be tape and reel packaged and marked, as a minimum, as indicated below and as specified on the detail drawing.

a. JPL part number in accordance with detail specification

b. Manufacturer's logo or name

c. Manufacturing date code

d. Inspection lot number

e. Serial number

ST/PT SPECIFICATION NUMBERING SYSTEM

ST12222	R	M	C	E	5000	A
BASIC DWG. No.	**PART TYPE**	**ELEMENT**	**CONFIGURATION**	**CHARACTERISTIC**	**RESISTANCE**	**TOLERANCE %**
	R=RESISTOR	C=CARB.FILM M=METAL FILM S=SPECIAL	C=CHIP S=SPECIAL	**-PART TYPE R-** Y= 10 PPM E= 25 PPM H= 50 PPM K=100 PPM M=300 PPM S=SPECIAL	(See note)	(See note)

NOTE: Four character resistance designation. The nominal resistance expressed in ohms is identified by four characters, consisting of three digits and a letter. The letter is used simultaneously as a decimal point, multiplier and a resistance tolerance designator in accordance with paragraph 1.2.5 of MIL-R-55342.

a. Greater than or equal to 1 ohm but less than 1,000 ohms, the letters A, D, G, J and M are used to represent a decimal point, depending on the resistance tolerance.

b. Greater than or equal to 1,000 ohms but less than 1 megohm, the letters B, E, H, K AND N are used to represent a decimal point, depending on the resistance tolerance.

c. Greater than or equal to 1 megohm, the letters C, F, T, L and P are used to represent a decimal point, depending on the resistance tolerance.

If size does not permit the ST in the part number may be omitted.

Designation of resistance values

Designation for .1%	Resistance
1A00 to 9A88 inclusive	1.00 to 9.88 inclusive
10A0 to 98A8 inclusive	10.0 to 98.8 inclusive
100A to 988A inclusive	100 to 988 inclusive
1B00 to 9B88 inclusive	1,000 to 9,880 inclusive
10B0 to 98B8 inclusive	10,000 to 98,800 inclusive
100B to 988B inclusive	100,000 to 988,000 inclusive
1C00 to 9C88 inclusive	1,000,000 to 9,880,000 inclusive
10C0	10,000,000

Designation for 1%	Resistance
1D00 to 9D88 inclusive	1.00 to 9.88 inclusive
10D0 to 98D8 inclusive	10.0 to 98.8 inclusive
100D to 988D inclusive	100 to 988 inclusive
1E00 to 9E88 inclusive	1,000 to 9,880 inclusive
10E0 to 98E8 inclusive	10,000 to 98,800 inclusive
100E to 988E inclusive	100,000 to 988,000 inclusive
1F00 to 9F88 inclusive	1,000,000 to 9,880,000 inclusive
10F0	10,000,000

Designation for 2%	Resistance
1G00 to 9G88 inclusive	1.00 to 9.88 inclusive
10G0 to 98G8 inclusive	10.0 to 98.8 inclusive
100G to 988G inclusive	100 to 988 inclusive
1H00 to 9H88 inclusive	1,000 to 9,880 inclusive
10H0 to 98H8 inclusive	10,000 to 98,800 inclusive
100H to 988H inclusive	100,000 to 988,000 inclusive

1T00 to 9T88 inclusive	1,000,000	to 9,880,000	inclusive
10T0	10,000,000		

Designation for 5%	Resistance		
1J00 to 9J88 inclusive	1.00	to 9.88	inclusive
10J0 to 98J8 inclusive	10.0	to 98.8	inclusive
100J to 988J inclusive	100	to 988	inclusive
1K00 to 9K88 inclusive	1,000	to 9,880	inclusive
10K0 to 98K8 inclusive	10,000	to 98,800	inclusive
100K to 988K inclusive	100,000	to 988,000	inclusive
1L00 to 9L88 inclusive	1,000,000	to 9,880,000	inclusive
10L0	10,000,000		

Designation for 10%	Resistance		
1M00 to 9M88 inclusive	1.00	to 9.88	inclusive
10M0 to 98M8 inclusive	10.0	to 98.8	inclusive
100M to 988M inclusive	100	to 988	inclusive
1N00 to 9N88 inclusive	1,000	to 9,880	inclusive
10N0 to 98N8 inclusive	10,000	to 98,800	inclusive
100N to 988N inclusive	100,000	to 988,000	inclusive
1P00 to 9P88 inclusive	1,000,000	to 9,880,000	inclusive
10P0	10,000,000		

Add the following paragraphs:

3.22 JPL review of manufacturer's documentation. The manufacturer shall make available the lot traveler(s) and process sheets for each part style (covering assembly, screening, forming, and, if required, QCI operations) for review and approval during the plant survey prior to use with their respective lots.

3.23 Data required with shipments. Data shall be identified by part number, lot number, trace number, and serial number range. The following data shall be included with each shipment of screened parts:

a. A copy of qualification or qualification retention data (for resistors which are QPL listed).

b. Electrical test data for all specified tests, including control unit data and delta calculations.

c. Data for any other special tests required by the detail specifications or procurement document.

d. Copies of reports on any failure analysis or engineering evaluations performed by the manufacturer.

e. Copies of any waivers or technical direction memoranda (TDMs) altering the specified requirements.

f. Certificate of conformance to the requirements of this specification, signed by the manufacturer's authorized representative.

g. If tests are labeled with test numbers, a cross-reference shall be provided to relate test numbers to descriptive test name. It is preferred that printed electrical test data be formatted such that all

measurements of a given parameter are displayed in a column, in serial number order, and two copies of the printed data shall be provided. Electrical test data, when required by the contract or purchase order, shall be provided in a magnetic medium. Either IBM DOS-compatible 5-1/4" or 3-1/2" diskette with data in ASCII format or 9-track tape (800 or 1600 bpi) with data in ASCII or EBCDIC format may be provided.

3.24 Serialization. Parts shall be serialized prior to the first electrical test.

3.25 Problem notification. The contractor shall notify the JPL contract technical manager within two working days of the occurrence of any of the following:

a. Any catastrophic failure after initial electrical test.

b. Any screening failures, including failures which appear to result from equipment failure or operator error.

c. Any need for remarking serial numbers.

d. Any failure of qualification retention test.

3.26 Failure analysis. JPL retains the option of performing any failure analysis. The manufacturer shall not do any destructive analysis of the parts without prior consent of the JPL contract technical manager. If there is a catastrophic failure, the JPL contract technical manager shall be notified within two working days.

3.27 Status reporting. When requested, the contractor shall provide the JPL contract negotiator with an oral or written status report stating the current status and expected ship date of each lot in process, and noting any significant problems.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Delete and substitute the following: The manufacturer is responsible for all tests performed on these resistors. JPL QA may perform a survey to ascertain compliance with the requirements of this specification. Information regarding recent DESC audits, if any, shall be made available upon request. Any deviation in test method must be approved by technical direction from the JPL contract technical manager before testing is begun.

Add the following:

4.3.1.1 Test equipment and inspection.

a. In the event of significant discrepancy between two sets of readings, corrective action (maintenance or re-calibration of the test equipment) shall be accomplished before proceeding with testing of the lot.

b. Test equipment calibration program: The last calibration date and the next calibration due date shall be displayed on test equipment. Signed and dated records of calibration shall be made available to JPL quality assurance representatives upon request.

4.4 Qualification inspection. Add the following: This section applies only to resistors which are QPL listed.

4.6.1 Inspection of product for delivery. Delete and substitute as follows: Inspection of product for delivery shall consist of table XII.

Add the following sub-paragraph:

4.6.1.1.3 Traceability. Each device shall be serialized and shall be traceable to the inspection lot and date code.

4.6.1.2 Group A Inspection. Delete and substitute as follows:

4.6.1.2 Screening Inspection. Screening inspection shall consist of the inspections specified in table XII in the order shown.

Table XII Delete and substitute as follows:

TABLE XII SCREENING INSPECTION

Inspection	Requirement Paragraph	Test Method Paragraph	Sampling Procedure
SUBGROUP 1			
Visual inspection	3.1,3.4,3.5 thru 3.5.3	4.7.1	100 percent inspection
Thermal shock	3.9	4.7.3	
Visual inspection	3.1,3.4,3.5 thru 3.5.3	4.7.1	
SUBGROUP 2			
Life Test (168 hrs)	3.16.3	4.7.10	100 devices/lot 0 failures
SUBGROUP 3			
Solderability	3.17	4.7.11	See 4.6.1.2.4

Delete paragraphs 4.6.1.3.1 through 4.6.2.1.3.

4.7.2 DC resistance. Add the following subparagraph:

d. Measurement precision (resolution): All measurements shall be recorded to five significant figures.

e. Bridge measurement accuracy: Bridge measurement accuracy shall be as specified in method 303 of MIL-STD-202. Repeatability shall be ±0.01%.

5. PACKAGING

Add the following paragraphs:

5.2 Packaging. The resistors shall be tape & reel packaged in accordance with MIL-R-39032. The reel shall be so marked that serial number and lot traceability will be maintained.

5.3 Marking of container. Mark the intermediate container (reel box, etc) with the JPL trace number.

5.4 Packing slips and invoices. The packing slip and invoice shall include the JPL trace number associated with each line item.

6. NOTES: Delete entirely.

Filename: CS510818.B
Directory: H:\USERS\514\SPECS\ACT-GENL
Template: F:\USERS\JSANSONE\MSOFFICE\WINWORD\TEMPLATE\NORMAL.DOT
Title:
Subject:
Author: Jennifer Sansone
Keywords:
Comments:
Creation Date: 08/10/95 11:07 AM
Revision Number: 1
Last Saved On:
Last Saved By:
Total Editing Time: 1 Minute
Last Printed On: 08/10/95 11:13 AM
As of Last Complete Printing
Number of Pages: 9
Number of Words: 3,135 (approx.)
Number of Characters: 17,870 (approx.)